SANDAKANIA 13 (1999): 31–40

New records of Bornean plants from the Semporna Islands off Sabah's east coast

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Summary. The following plant species, recorded during a survey of the flora and vegetation of the Semporna Islands off Sabah's east coast, are newly documented for the flora of Borneo: *Antirhea edanoi* (Rubiaceae), *Cheilanthes nudiuscula* (Adiantaceae), *Dracaena multiflora* (Dracaenaceae), *Fagerlindia emanuelssoniana* (Rubiaceae), *Rhyssopteris timoriensis* (Malpighiaceae), *Selaginella tamariscina* (Selaginellaceae), and *Stemona tuberosa* var. *tuberosa* (Stemonaceae). Stemonaceae also represents a new family record for Borneo whereas *Fagerlindia* and *Rhyssopteris* are new genus records.

The Semporna Islands, off Semporna town in east Sabah, include the main islands of Tetagan, Bodgaya and Boheydulong (see Wong *et al.* 1999). They are the highest remaining

portions above present sea level of a Quaternary volcanic crater rim. On Bodgaya and Boheydulong, in addition to the low, scrub-like vegetation on the main rock outcrops and the taller forests on porous, weathered volcanic soils forming the steep slopes around them, there are scattered patches of beach vegetation as well as poorly developed mangrove patches. Regenerating coastal forest entirely covers Tetagan and some slopes on the other two islands.

During a survey of the vegetation and flora of these islands in October 1998, a significant number of plant species were recorded that were new to the flora of Borneo. These are listed here and a discussion of their biogeographical significance is provided.

NEW RECORDS FOR THE BORNEAN FLORA

The following species recorded on the Semporna Islands have never before been recorded for the Bornean flora, i.e., the flora of the main island of Borneo and smaller islands on its continental shelf included within any of the political territories of Sabah and Sarawak (part of Malaysia), Kalimantan (part of Indonesia) or Brunei. These include one new family record, one new genus record, and another five new species records.

NEW FAMILY RECORD:

Stemonaceae (represented by *Stemona tuberosa* Lour. var. *tuberosa*) (Fig. 1)
Collection: *John Sugau* JBS 372, Boheydulong island (SAN).
Previously known distribution: southeast continental Asia, Taiwan, Hainan, Philippines, Flores, Ambon.
This climber was found at the fringe of low scrubby forest, near the edge of a cliff on the northwestern part of Boheydulong. It is apparently rare even there, encountered only once.

NEW GENUS RECORDS:

Fagerlindia (represented by *F. emanuelssoniana* Ridsd.) (Rubiaceae)
Collections: *John Sugau* JBS 366, Boheydulong island (SAN), JBS 399, Bodgaya island (SAN).
Previously known distribution: Palawan.
This is a spiny, low scambling plant, sometimes erect and shrublike in juvenile stages, rather common in isolated sites just behind the vegetation fringing the sea.

Rhyssopteris (represented by *R. timoriensis* (DC.) Jussieu) (Malpighiaceae) (Fig. 2)
Collection: *John Sugau* JBS 387, Boheydulong island (SAN).

Fig. 1. *Stemona tuberosa* Lour. var. *tuberosa* (Stemonaceae), flowering. (Photo: K.M. Wong)

Fig. 2. *Rhyssopteris timoriensis* (DC.) Jussieu (Malpighiaceae), with flowers and fruits. (Photo: K.M. Wong)

Previously known distribution: central and east Malesia, in the Philippines, Sulawesi, Java and New Guinea.
This species, a climber, was found at a beach site on Boheydulong and not encountered again during our survey. The suborbicular, opposite leaves that bear a pair of dish-shaped glands at the base of the leaf blade, and the fruits with three winged portions (mericarps), are distinctive.

NEW SPECIES RECORDS:

FERN-ALLY
Selaginella tamariscina (Beauv.) Spring (Selaginellaceae) (Figs. 3 & 4)
Collection: *Wong* WKM 2858, Bodgaya island (SAN).
Previously known distribution: Siberia, Japan and China, southward to Vietnam, Thailand, the Philippines and Lombok.
Growing on exposed to partially shaded, gently sloping rockfaces, this *Selaginella* is a small plant only 4–5 cm high, occasionally found on both Bodgaya and Boheydulong islands. Its growth habit is hitherto unknown among Bornean or Malaysian *Selaginella*. Older (basal) stem portions and roots intertwine to form a false trunk, from the top of which the leafy branches radiate outward, forming a rosette. More interestingly, the leafy distal branches of this *Selaginella* curl inwards when conditions get hotter during the day, and uncurl to reveal the flattened leafy sprays when adequate moisture is available, such as during a rain episode and in the night. Individuals taken away to test with alternate drying-out and rehydration episodes confirmed this reversible curling response, perhaps best described by the term poikilohydry. The plant probably gets sufficient exposure to sunlight to maintain

Fig. 3 (Left). *Selaginella tamariscina* (Beauv.) Spring (Selaginellaceae), with foliage spread out under moist conditions. (Photo: K.M. Wong) **Fig. 4** (Right). *Selaginella tamariscina* with foliage curled up during exposure to strong light. (Photo: K.M. Wong)

photosynthetic efficiency between the opening of the sprays during night-time and the curling of the sprays in late morning. In its habit it is similar to the American resurrection plant, *S. lepidophylla*. It is not listed in Parris & Latiff's provisional checklist of Malaysian pteridophytes (Parris & Latiff 1997).

FERN

Cheilanthes nudiuscula (R. Br.) T. Moore (Adiantaceae) (Fig. 5)

Collection: *John Sugau* JBS 400, Boheydulong island (SAN).

Previously known distribution: Sumatra, Java, the Lesser Sunda Islands, south China, Taiwan, Philippines, Sulawesi, Maluku, New Guinea, New Hebrides, Samoa, Fiji, New Caledonia and Australia.

This species is a brown-tomentose small fern that grew in completely open conditions, forming thick tussocks in cracks and depressions on rock faces on both Boheydulong and Bodgaya islands. It is not listed in Parris & Latiff's provisional checklist of Malaysian pteridophytes (Parris & Latiff 1997). *C. javensis* (Willd.) Desv. is a synonym.

MONOCOT

Dracaena multiflora Warburg (Dracaenaceae) (Fig. 6)

Collection: *Wong* WKM 2840, Boheydulong island (SAN).

Previously known distribution: Philippines (including Palawan and Sulu archipelago), Sulawesi.

Fig. 5. *Cheilanthes nudiuscula* (R. Br.) T. Moore (Adiantaceae), growing on exposed volcanic rock. (Photo: K.M. Wong)

Fig. 6. *Dracaena multiflora* Warburg (Dracaenaceae) in the summit scrub on Boheydulong Island. (Photo: K.M. Wong)

This yucca-like species is one of the most distinctive life forms on the Semporna islands, common in the scrub vegetation developing on the rock outcrops and also present in the forest developing on the steep earth slopes. It commonly grows to 10 m tall in the exposed scrub forest but somewhat larger individuals (to 15–20 m tall) can be encountered in forest shade just below the exposed outcrops that bear the scrub. In the coastal mixed forest on steep slopes on Boheydulong, an exceptional individual was encountered which was 25 m tall and which had an approximate basal diameter of 1.5 m. It can also be found growing at the sea fringe, on tuff boulders and cliffs. It is found on Boheydulong, Bodgaya and Tetagan, but not the other nearby (low, white-sand) islands, such as Sibuan, Maiga or Mantabuan.

DICOT

Antirhea edanoi Chaw (Rubiaceae) (Fig. 7)

Collections: *Wong* WKM 2849, Boheydulong island (SAN), *John Sugau* JBS 373, Boheydulong island (SAN).

Previously known distribution: Tawitawi Island (Philippines).

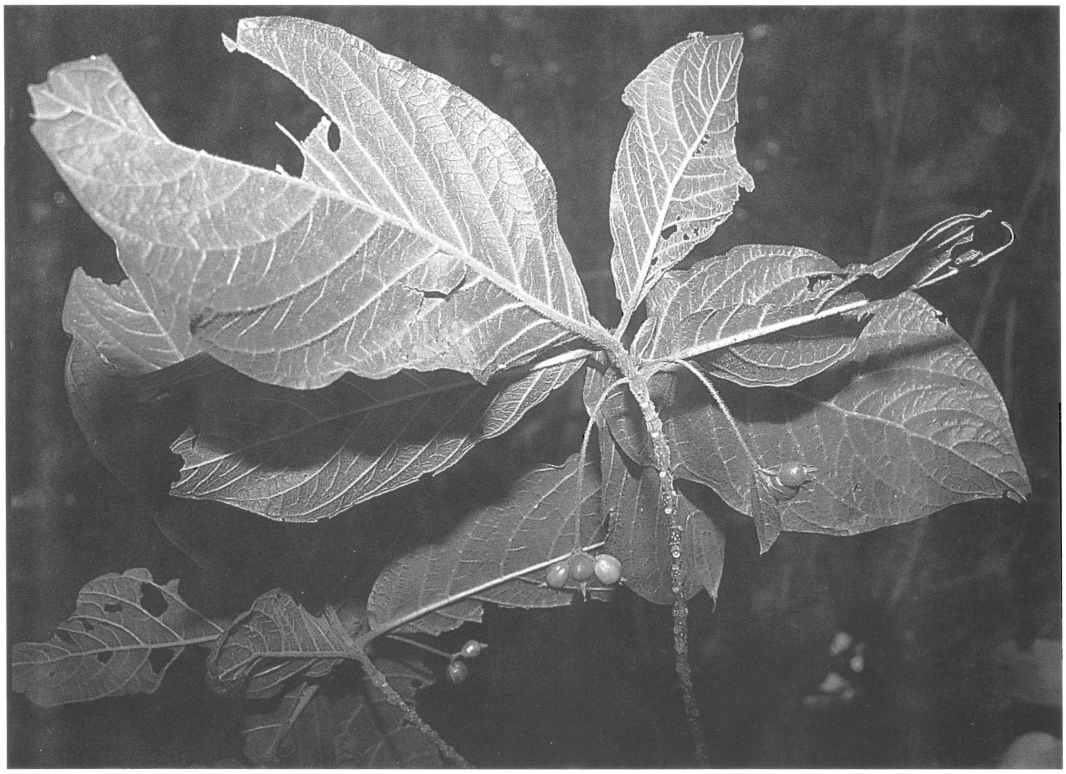

Fig. 7. *Antirhea edanoi* Chaw (Rubiaceae), fruiting. (Photo: K.M. Wong)

This is a small understorey tree to about 5 m tall in the mixed coastal forest on steep slopes of weathered volcanic material, sometimes growing on rocks in forest shade. It was apparently gregarious but found on both Boheydulong and Bodgaya islands. This species was previously known only from Tawitawi in the same arc of volcanic islands (Chaw & Darwin 1992).

BIOGEOGRAPHICAL CONSIDERATIONS

From their distribution, most of these new records (*Stemona tuberosa*,*Rhyssopteris timoriensis*, *Cheilanthes nudiuscula*, *Selaginella tamariscina*) are elements of a more seasonal climate that generally avoid the everwet core of western Malesia including Sumatra, the larger part of the Malay Peninsula and Borneo proper. Their presence on the islands off Semporna is not surprising as the coastal portions and islands of Sabah are known to harbour species more typical of seasonal climates farther north (Wong 1998). Such species, representing what has been called a "seasonal Asiatic-Australasian intrusion" into north Borneo, are mostly not expected to occur commonly in Borneo except in the islands off the Sabah coast and so are rather rare species in both Sabah and Borneo.

Other well-known examples of this sort of seasonal Asiatic-Australasian floristic intrusion include *Severinia* (Rutaceae; represented in Borneo by two species in north and northeastern Sabah only), a genus most well developed in south China, Indo-China, and the more seasonal parts of Malesia (includingSulawesi, Maluku, Java and parts of New Guinea); and *Exocarpus* (Santalaceae), which ranges from Indo-China, through the Philippines, to the rest of central and eastern Malesia and Australia and the Pacific. *Alectryon glaber* (Sapindaceae) is recorded in Borneo only on Balambangan island off north Sabah (Wong 1996), although its general distribution includes the Philippines (including Palawan), Sulawesi, Ceram, the Kai islands, east Java and the Lesser Sunda islands (Leenhouts 1994). Likewise, *Aphananthe cuspidata* (Ulmaceae) is known in Borneo only through a single collection from the Ranau area in Sabah, although it ranges from India and Indo-China, through the Philippines to Sulawesi and the Lesser Sunda Islands.

On the other hand, *Antirhea edanoi* (Tawitawi and Semporna islands), *Dracaena multiflora* (Philippines, Palawan, Sulu-Semporna islands, Sulawesi), and *Fagerlindia emanuelssoniana* (Palawan and Semporna islands) should be considered regional endemics, being species distributed only in the Philippines-Sulu-Semporna area. The occurrence of narrow endemics in this region, such as *Antirhea edanoi*, *Acacia tawitawiensis* (Mimosaceae) (Sulu islands: Nielsen 1985), *Acacia palawanensis* (Mimosaceae) (Palawan: Nielsen 1985) and *Guioa palawanica* (Sapindaceae) (Palawan: Welzen 1994) is also not surprising given the many island clusters and occurrence of mosaics of specialized substrates forming habitat islands, such as volcanics, ultramafic rocks or limestone.

ACKNOWLEDGEMENTS

The Bodgaya islands survey was organized for the Semporna Islands Park project, promoted by the Marine Conservation Society, Nature Link, WWF-Malaysia and Sabah Parks, and funded by the Commission of the European Communities. K.M. Wong, J.B. Sugau and J.T. Pereira are grateful to Dr Elizabeth Wood, Kirsten Sundeth, Robert Ong, Rimi Repin, Jakaria bin Haji Mohd. Jakob and Haji Mahmud Haji Mansor for organizational assistance. K.M. Wong participated in the survey on research leave granted by the University of Malaya. Dr Harald Schneider (Rijksherbarium, Leiden) kindly sent information on *Cheilanthes nudiuscula*. Professor P.S. Ashton (Harvard University), Dr M.M.J. van Balgooy (Rijksherbarium, Leiden) (who also confirmed the identity of the *Rhyssopteris*), Dr J. Dransfield (Royal Botanic Gardens, Kew) and Dr D. Madulid (Philippine National Herbarium) were very helpful with information and comments on the identification of the *Dracaena*. Professor C. Puff (University of Vienna) is thanked for his comments on the manuscript. Reuben Nilus, Hubert Petol, Leopold Madani, Diwol Sundaling, Good Antok, Kuntil Loloh, Postar Miun, Ahmad Sappan, Tajuddin Mustapa, and Ubaldus Majawal helped in the fieldwork.

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